

## Energy Harvesting Wireless Strain Networks, Phase I

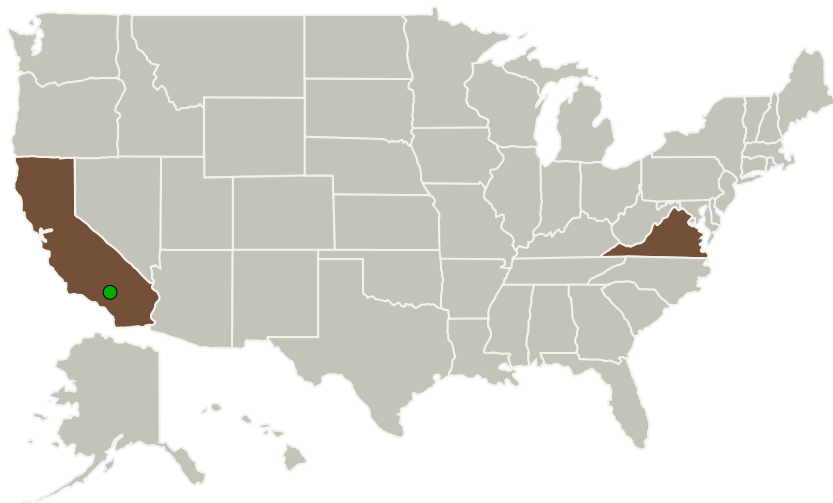
Completed Technology Project (2012 - 2013)



## Project Introduction

Prime Research LC (PPLC) and Virginia Tech (VT) propose to develop an energy harvesting wireless strain node technology that utilizes single-crystal piezoelectric fiber-based energy harvesting, highly sensitive and low power piezoresistive strain gages, and ultra wide-band (UWB) ultra low power radio communication. Single crystal piezoelectric fibers promise to improve piezoelectric harvesting power density by a factor of 4 – 5  $\square$  while the ultra wide-band radio (UWB) and piezoresistive strain gages promise to lower power requirements by almost 100x. The proposed Phase I work will demonstrate the technologies critical to successful commercialization of a low cost, mass producible, postage stamp sized wireless strain node. A key result of the Phase I effort will be demonstration of the proposed harvesting and sensing technologies. Demonstration of these two items will remove the most significant hurdles to a successful commercial product. Phase I will provide the data necessary to perform an integrated system design in the Phase I Option and during Phase II, PPLC and VT will fabricate the integrated device for use in field trials.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Prime Photonics, LC	Lead Organization	Industry	Blacksburg, Virginia
● Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California
Virginia Polytechnic Institute and State University(VA Tech)	Supporting Organization	Academia	Blacksburg, Virginia

## Primary U.S. Work Locations

California	Virginia
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## Project Transitions

▶ **February 2012:** Project Start

✓ **February 2013:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138132>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

Prime Photonics, LC

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

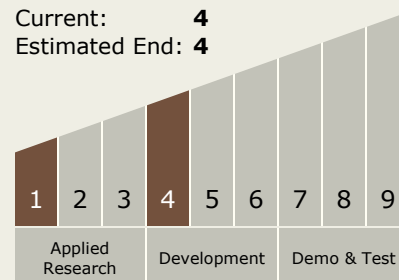
Carlos Torrez

## Principal Investigator:

John Coggin

## Technology Maturity (TRL)

Start: **1**  
Current: **4**  
Estimated End: **4**



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## Technology Areas

### Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.1 Materials
    - └ TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System